Bulk Is The New Black: Consumer Attitudes, Perceptions and Purchase Intentions Towards Bulk Food Groceries in Portugal

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Title: Bulk Is The New Black: Consumer Attitudes, Perceptions And Purchase Intentions Towards Bulk Food Groceries in Portugal

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Abstract: Purchasing food in bulk has become a growing practise among grocery shoppers in recent years. No longer a dated tradition from the 19th century, bulk is now seen as a modern alternative to package-loaded products. Besides a more sustainable nature of transactions, bulk offers several advantages, from lower prices to the chance of portion customization and reduced food waste. However, literature identifies many setbacks for businesses invested in selling unpackaged food. Hygiene regulation in self-service systems is challenging and negatively perceived by many shoppers. Plus, a high rate of spillage, theft and losses undermines retailers' cash flows.

This study focused on the market of bulk food groceries in Portugal. Prices of bulk foods were analysed and compared with the corresponding packaged alternatives, in order to assert price competitiveness. Prior literature on the subject was consulted to conceive a framework for research methods. Six interviews to storeowners operating in the Portuguese bulk foods market served as valuable insights for the investigation. Finally, an online survey with a sample of 309 bulk consumers and non-consumers presented main barriers and advantages of bulk, as well as the attitudes and perceptions that have an influence on purchase intentions.

Grocery shoppers in Portugal showed a favourable inclination towards purchasing bulk. Additionally, bulk consumers are concerned about sustainability, portion control and consider price the main driver for store choice.

Resumo: Comprar alimentos a granel está a tornar-se cada vez mais popular entre consumidores de produtos de mercearia. Outrora considerado uma tradição do século XIX, o granel é agora uma alternativa moderna aos produtos empacotados. Para além de representar uma forma sustentável de comércio, o granel oferece várias vantagens, desde preços mais baixos à oportunidade de controlar o tamanho das porções e reduzir o desperdício alimentar. Contudo, artigos científicos identificam algumas das contrariedades encaradas pelos negócios a granel. A regulação de higiene nos dispensadores de produtos é desafiante e vista com desconfiança por parte dos consumidores. Ademais, um elevado nível de perdas e roubo impactam negativamente os rendimentos dos retalhistas.

Este estudo focou-se no mercado de venda a granel em Portugal. Produtos alimentares a granel foram comparados com as alternativas embaladas para estudar a competitividade dos preços. A literatura académica existente sobre o tema foi consultada para construir uma estrutura de pesquisa metodológica. Seis entrevistas a donos de lojas a granel a operar no mercado português serviram para complementar a investigação. Por fim, um survey online com uma amostra de 309 consumidores serviu para identificar as principais barreiras e vantagens do granel, bem como as atitudes e percepções que influenciam as decisões de compra. Os compradores de alimentos de mercearia em Portugal demonstraram intenções de compra favoráveis ao granel. Os consumidores de granel preocupam-se com a sustentabilidade, controlo de porções e consideram o preço a maior motivação para a escolha de loja.

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List of Abbreviations

US: United Stated

UK: United Kingdom

NZ: New Zealand

EU: European Union

OECD: Organisation for Economic Co-Operation and Development

FSC: Food Supply Chain

SR: Store Respondent

WTP: Willingness To Purchase

1. Introduction

Selling food in bulk used to be a common way of doing business in traditional grocery stores between the end of the 18th century and the beginning of the 19th century (Johnson, 1984). According to Johnson (1984), dry food was traditionally sold from large bins and served into a bag by a store clerk. The practice gradually lost popularity in retail - except for fresh produce - as health and sanitation practises became more strictly regulated, packaging technology evolved and customers started to look for a more convenient experience when shopping for groceries (Johnson, Sommer and Mayes, 1985).

Food packaging offers several benefits for both consumers and retailers. On one hand, it saves products from contamination, protects them from spoilage and contains nutritional information, increasing shopping and storage convenience for customers (Verghese, Lewis, Lockrey and Williams, 2015). On the seller's side, packaging represents a marketing tool, provides easier handling and shelf-display and makes the checkout faster by standardizing quantities (Johnson et al., 1985).

However, selling "loose" unpackaged products, has regained popularity in recent years (Rapp, Marino, Simeoni and Cena, 2017). Many large retailers have invested in self-serve dispenser areas inside their stores, where customers can buy food in bulk (Rapp et al., 2017). Unlike the earlier systems, when store employees served the products for customers, now bulk sales follow a self-service philosophy (Johnson, Sommer and Martino, 1985). In Portugal, Grupo Auchan and Sonae are examples of two companies who introduced bulk food sections in their stores, while still offering packaged alternatives to the products.

Smaller bulk businesses are also becoming a growing trend (Rapp et al., 2017). These stores sell most of their products in bulk bins or in gravity-fed dispensers, and customers can either carry their own containers to the store and fill them with the desired amount of product, or use a bag provided by the establishment (Johnson et al., 1985). Initially starting with co-ops[1] and healthy food stores, (Johnson et al., 1985) these groceries have now evolved into a more hip and modern way of shopping, popular for its competitive prices and eco-friendly nature (Rapp

[1] A co-op is an "autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly owned and democratically-controlled enterprise" (International Co-operative Alliance, n.d).

et al., 2017). Maria Granel, in Lisbon, is an example of a recent bulk business that attracted much media attention (e.g. Salvador, 2016; Oliveira 2015).

Studies attribute this recent trend to growing concerns from manufacturers, retailers and consumers regarding waste reduction and sustainability (Beitzen-Heineke et al., 2016). In fact, a shift into "zero-packaging" consumption would reduce the amount of packaging waste, cut down CO_2 emissions produced by the global food supply chain and decrease the depletion of natural resources (Minami et al., 2010) as well as promote better nutrition for customers (Beitzen-Heineke et al., 2016). Nonetheless, the prices of bulk foods are perhaps the main driver for this type of consumption. Unpackaged food has often been considered cheaper than the same product in a package not only due to the reduced costs in packaging materials, but also because bulk allows consumers to purchase smaller portions of food (WRAP, 2007).

However, bulk comes with its challenges. Sanitation in bulk systems is not only more arduous for retailers, but it is also perceived with mistrust from consumers (Doser, 1999) and is considered one of the main barriers to purchase (Johnson, 1984). Purchasing food in bulk is also more time consuming (Beitzen-Heineke et al., 2016) and researchers believe that younger shoppers prefer the convenience of packages (WRAP, 2007). Additionally, bulk products are generally unbranded and undifferentiated (Rapp et al., 2017) which means brand-sensitive shoppers are not as inclined to buy (Minami et al., 2010).

Research Proposal

The purpose of this paper is to identify the underlying motivations of Portuguese consumers when purchasing unpackaged groceries in bulk. These findings could help further develop theory regarding consumer behaviour towards the purchase of bulk foods and understand the main barriers between non-buyers and purchase.

Besides food, there is a variety of products sold in bulk, such as beverages, cleaning products, health and beauty products and DIY and garden products (WRAP, 2007). For the purpose of this paper, only bulk food groceries will be considered, for representing the largest bulk sector, with a wide range of fitting products. This sector includes dry foods such as: breakfast cereals, rice, pasta, grains, coffee beans, tealeaves, spices, nuts, dried fruit and dried pet food

and excludes fresh produce (i.e. fruits and vegetables), which is traditionally sold in bulk and therefore does not represent a new market segment.

Research Questions:

1. What are the main drivers for purchasing bulk food, instead of opting for the packaged version of the same product?

2. What are the main barriers for grocery shoppers to purchase food in bulk?

3. Which personal characteristics have an influence on purchase intentions towards bulk?

2. Literature Review

For this chapter, existing literature on the topic of packaging and bulk sales was consulted and used to outline the existing products in the bulk category, customer perceptions, types of stores and environmental implications in the food supply chain. Additionally, the paper establishes a general picture of the Portuguese bulk foods market.

2.1. Packaging

The Eurostat defines packaging as "any material which is used to contain, protect, handle, deliver or present goods" (Eurostat, 2017). Packaging offers protection from the surrounding environment; defends food from chemical and physical challenges and blocks the light in order to preserve the product's nutrients and colours (Risch, 2009). Existing literature describes several advantages of food packaging, such as a more convenient shopping experience, as food is offered portioned and sealed; product promotion (in the form of marketing and branding); providing information on the nutrients, ingredients, preparation and end-of-life management; waste reduction, as it helps retain the products' quality for longer, and easier handling, transportation and storage of the products (Verghese, Lewis, Lockrey and Williams, 2015). Packaging also makes it possible to consume year-round an extensive range of food products that would otherwise be spoiled without a conservative shelter (Risch, 2009). Additionally, there are several products (such as microwave popcorn) that come in special packages designed to perfectly cook them, resulting in a comfortable and beneficial consumer experience (Risch, 2009).

Despite the advantages of packaging, there is growing pressure for retailers to adopt more sustainable supply chains by, for instance, reducing the amount of generated waste (Minami et al., 2010). If the amount of packaging produced in the retail industry were to decrease, the need for recycling it - considered time consuming and expensive - would also decrease (Minami et al., 2010). The rapid proliferation of package-free stores and bulk sections in supermarkets (Rapp et al., 2017) is a "green" response to resource waste and can remarkably reduce CO_2 emissions in the global food supply chain as well as reduce food waste (Beitzen-Heineke et al., 2016).

2.2. Bulk

In retail, the word "bulk" can indicate two different concepts. The first is to buy a large quantity of a product at once, as a way to reduce the unit price (e.g. when a bakery orders large amounts of flour) (Cambridge Dictionary, n.d.). The second definition indicates buying dry or liquid products that are not divided into packages, sold by volume or weight (Merriam-Webster, n.d.; BusinessDictionary, n.d.). For the purpose of this paper, the word "bulk" is used to refer to the latter definition.

2.2.1. Bulk Category

Types of Products in the Bulk Category

According to a report developed by WRAP (Waste & Resources Action Programme) in 2007 which studied the presence of bulk systems in the United States (US), New Zealand (NZ), the United Kingdom (UK) and Australia, there are three key identifiable bulk markets: grocery (food and non-food); health and beauty; and DIY[2] and garden products (WRAP, 2007). The WRAP report will be used in the present paper to illustrate the main product categories within the industry.

Grocery products are split into two groups: food and non-food. Within the food category there are dry foods (like cereals, rice, grains, oats, flour and spices), liquid foods (e.g. cooking oils, milk, water, sauces and juices) and general produce (e.g. nuts, dried fruit and dried pet food). Non-food grocery products can be solid (like cat litter and detergents), liquid (e.g. liquid soaps and household cleaners) and small items (e.g. pens, pencils and other stationary).

The three health and beauty categories identified by the report are solids (such as aromatherapy products), liquids (e.g. shampoo, skin care and moisturisers) and small items like soap bars.

Finally, DIY and garden products are splint into solids (e.g. grass seeds, compost and cement), liquids (such as paint and outdoor cleaning products) and small items (e.g. screws, nails, batteries and door handles).

Despite the variety of products offered in bulk, the study identifies the grocery sector as the biggest one, with the "widest range of suitable products". For the purpose of this paper, the grocery sector will be the one under analysis.

[2] DIY is an acronym for do-it-yourself, described by the Merriam-Webster dictionary as "the activity of doing or making something (as in woodworking or home repair) without professional training or assistance".

Types of Stores Selling Bulk Food Groceries

There is considerable heterogeneity when it comes to the types of stores that sell grocery goods in bulk. According to Johnson (1984), the modernized trend of selling bulk foods started in "small health food stores and food co-ops", after which it gradually started growing until reaching the whole retail industry. Nowadays, consumers can find bulk products in a variety of stores, from large chain supermarkets that offer bulk products as well as packaged alternatives to food Co-ops and smaller, family owned stores. Small grocery stores can also vary in style. For instance, they can be exclusively packaging free, where sustainability and waste reduction are the key concepts or have a more traditional style, focusing more on price. Lastly, they can focus on the sale of premium, organic or local products in bulk (Rapp et al., 2017; Beitzen-Heineke et al., 2016).

Positioning of Bulk Stores

Although there are many types of stores and supermarkets selling goods in bulk (Rapp et al., 2017), existing literature recognizes two main types of positioning: "traditional bulk stores" and "zero-packaging stores" (Rapp et al., 2017; Beitzen-Heineke et al., 2016). Traditional bulk stores follow the old traditions of street markets and spice bazaars, where customers choose the amount of product that meets their needs and take it home wrapped inside a bag provided by the store (Rapp et al., 2017). In these stores, customers primarily value saving money or reducing food waste and environmental concerns are not considered (Rapp et al., 2017). On the other hand, the main purpose in zero-packaging stores is to reduce the environmental footprint of customers' purchasing activities, as well as those of the retailer's operations by reducing packaging waste and educating people to reuse containers (Rapp et al., 2017). Moreover, these stores often include organic food, local sourcing and fair trade in order to improve social impacts in the food supply chain (Beitzen-Heineke et al., 2016). Organic food is generally certified by a certification authority and is produced following specific standards that aim to minimize the use of synthetic fertilizers and chemicals, therefore reducing pollution during the production process and optimizing health benefits for consumers (IFST, 2013).

Main Technologies for Self-dispensing Bulk Systems

According to WRAP (2007), there are two main types of systems used for selling groceries in bulk: bulk bins and gravity-fed dispensers. The study reports bulk bins to be the most

widespread technology in both the US and the UK (WRAP, 2007). The bins may either be open top or lidded and customers use a hand scoop to handle the desired amount of product into a bag or container (Johnson et al., 1985).

On the other hand, gravity-fed dispensers come with a top lid that is used by staff members only to refill each product (WRAP, 2007). Customers cannot actually touch the product before purchasing and need to use a hand crank - or other type of mechanism - for the food to be dispensed into a container (Johnson, 1984). Some dispensers can be adjusted to facilitate portion control, by disbursing a fixed quantity of product in each turn of the handle (WRAP, 2007). The WRAP study (2007) claims that the fixed-quantity system can simplify pricing for customers, but it may also result in a less flexible shopping experience. Literature on this topic points to a general consensus towards the preference of gravity-fed dispensers by bulk consumers (WRAP, 2007; Johnson et al., 1985), the main reason being a perception that the system is more sanitary (WRAP 2007). Bulk bins are more vulnerable to contamination because customers may use their hands to handle the food or drop things into the bins (Johnson et al., 1985).

2.2.2. Willingness to Purchase Bulk Products

Perceived Price

Price reductions are used in retail to provide greater value for money and originate an expansion in store traffic (Grewal, Krishnan, Baker and Born, 1998). Plus, reduced prices are considered one of the main reasons for customer approval of bulk shopping (Minami et al., 2010) and value for money a central benefit for customers of bulk dispensing systems (WRAP, 2007).

The WRAP study (2007) found that in US stores, bulk systems could reduce the price of goods between 30 to 60% in comparison to the same quantity of a pre-packed product (WRAP, 2007). Furthermore, the study claims consumers tend to buy smaller quantities in bulk then in packages, which further reinforces savings.

In Italy, a large food retailing cooperative called CRAI (Commissionaria Riunite Alta Italia) introduced a bulk section - "Eco Point" - in its stores in 2006. CRAI reported that package-free products were 10 to 20% cheaper in comparison to packaged ones, and in some situations

the savings could go up to 70% (Minami et al., 2010). Minami et al. (2010) claim one of the main reasons for price reductions comes from the cut in packaging costs for retailers, which are in turn echoed in retail prices. Price per unit is lower in bulk products, given that customers are not paying for added marketing and packaging costs (Beitzen-Heineke et al., 2016). Additionally, an in-house survey to 280 CRAI customers showed that price was the most cited benefit of bulk shopping (mentioned by 63.1% of respondents) before environment, customization and entertainment (Minami et al., 2010).

Portion Control

The possibility of purchasing customized amounts of product has been considered by customers the most important reason to buy in bulk (Johnson, 1984; Umesh and Prasad, 2016) and is especially appreciated by elderly people (Minami et al., 2010). Portion control also motivates customers to try out a higher range of different products and ingredients, because it allows them to purchase smaller quantities of each product at the same or lower expense in comparison to the packaged substitutes (Beitzen-Heineke et al., 2016; Andersson, 2017). Although conventional supermarkets may also offer smaller portions, the products come in packages, raising the unit price and resulting in higher expenditures (Beitzen-Heineke et al., 2016). A study developed in India also concluded that most shoppers prefer to purchase rice in bulk, as it allows them to choose the quantity they want to buy and at the same time see the quality of what they are buying (Umesh et al., 2016).

Health Benefits and Perception

In 2015, 19.5% of the adult population of the OECD (Organisation for Economic Co-Operation and Development) countries was obese, as well as one in every six children (OECD Obesity Update, 2017). This number has been growing since 1990 and was projected to continue increasing until at least 2030 (OECD Obesity Update, 2017). An unhealthy diet is full of sugar, salt and saturated fat, which can mostly be found in processed foods, which in turn are generally sold in packages (Beitzen-Heineke et al., 2016). In 2008, EU (European Union) Health Commissioner Markos Kyprianou described package labels as sometimes "confusing, overloaded or misleading" (BBC, 2008).

Food items sold in bulk tend to be less processed than packaged foods (Johnson, 1984), as well as fresher and more natural, often times organic (Beitzen-Heineke et al., 2016). Beitzen-Heineke et al. (2016) claim that according to experts on FSC (food supply chain)

management, the zero-packaging movement can actually help promote a healthier diet by offering healthy foods - often more expensive than fast food - at lower prices. Portion control also allows customers to reduce the amount of food they buy, reducing the risk of overconsumption (Beitzen-Heineke et al., 2016). Furthermore, consumers tend to perceive bulk food as healthier and more natural than packaged products (WRAP, 2007).

Perceived Hygiene

Sanitation is often considered in literature the primary concern when it comes to buying food in bulk (Johnson, 1984; Doser, 1999; WRAP, 2007). A consumer survey in 1983 involving 897 respondents in the US found that the barrier to purchase unpackaged food from bulk bins was "a feeling that the system was unsanitary" (Johnson, 1984). The study found the main causes for consumers' contamination worries to be children playing with the bins; improper use of tools to retrieve the goods from the bins and the possibility of "people coughing over open bins" (Johnson, 1984). Furthermore, the products' vulnerability to insects and limited protection from droplets and sneezes are also causes for concern (Doser, 1999). According to Doser (1999), the issue results from the exposure of easily reachable self-service food systems to a large number of people on a daily basis, with little monitoring from store staff. Serving tongs, spoons or scoops may also be dirty or mishandled (for instance, when consumers touch the serving ends) if not even missing from the designated place, which can lead customers to touch food with their hands (Doser, 1999). The low level of perceived hygiene in bulk bins results in a customer preference towards purchasing dry foods or non-food items altogether, over beverages and liquid food items (WRAP, 2007).

Existing literature recommends several standards to be followed by retailers and store owners in order to improve sanitation and customer perceptions. According to WRAP (2007), consumers largely favour gravity-fed dispensers over bulk bins, which is caused by the lower perceived risk of contamination. It is also recommended that the machines should be completely transparent and designed as to avoid accidental food spillage (WRAP, 2007). Doser (1999) claims the floor and area surrounding bulk dispensers should be kept clean and preferably overseen by store employees and that the equipment and utensils should be washed on a regular basis, as a way to avoid "vermin harbourage".

Convenience Issues

Buying products in bulk - rather than packaged - translates into a more time-consuming and less convenient shopping experience (Beitzen-Heineke et al., 2016). Many food packages increase convenience for consumers by allowing, for instance, ready-made products to be cooked or heated inside the package, easing the overall experience (Risch, 2009). The WRAP study (2007) and Minami et al. (2010) believe that younger shoppers prefer the convenience of purchasing packaged goods. When buying in bulk, customers need to handle the products, pack them and, in many situations, measure them before paying, rather than just grabbing a package and heading for the counter (Beitzen-Heineke et al., 2016). Additionally, owners of zero-packaging stores - where customers are invited to reuse their own containers as a way to prevent packaging waste - mentioned that shopping trips needed to be planned ahead of time, to know how much storage will be needed (Beitzen-Heineke et al., 2016). Furthermore Beitzen-Heineke et al. (2016) argue that there is a lower range of goods sold in bulk, as many food products need refrigeration in order to maintain quality, such as cheese and meat.

Information Availability

Consumers also report lack of information on nutritional components of food as a weakness in bulk systems (WRAP, 2007; Beitzen-Heineke et al., 2016). Even though most bins have labels instructing what the product inside is, many do not show information regarding where it came from or the "sell by" date (WRAP, 2007), as well as the amount of calories, distribution of nutrients and storage instructions (Beitzen-Heineke et al., 2016). Moreover, bulk foods do not generally come with preparation instructions (WRAP, 2007).

Unbranded Products

"Brand" is defined by the American Marketing Association as "a name, term, design, symbol or any other characteristic which makes a selling good or service different from goods and services of other sellers".

A product's brand plays a strong role towards purchase intentions (Vraneševic' and Stančec, 2003): It differentiates it from competitors; creates an association with quality; has the ability to build trust and loyalty and helps motivate purchases (Vraneševic' et al., 2003). Most people prefer to buy branded products (WRAP, 2007), which poses a limitation for bulk sales, as most containers are unbranded and undifferentiated (Rapp et al., 2017). Beitzen-Heineke et al. (2016) claim that most bulk sections only sell one brand of each product, limiting options for customers.

Additionally, CRAI has reported that despite their bulk sales registering a growth of 1.5 to 2.5%, this has had no effect on brand-sensitive consumers (Minami et al., 2010). According to Kapferer and Laurent (1992), brand-sensitivity is a psychological trait where brand has an important influence on the decision-making process of the buyer.

2.2.3. Bulk Consumer Demographics and Characteristics

Literature describing demographic characteristics of consumers' willingness to purchase bulk products is limited. Notwithstanding, previous studies identified age and gender as having significant effects on the motivation to purchase bulk products (Johnson, 1984; Sommer, Becker, Hohn and Warholic, 1983). Furthermore, attitudinal attributes such as environmental concerns and health perceptions are considered drivers for purchasing bulk foods, as well as for type of store choice (Rapp et al., 2017; Beitzen-Heineke et al., 2016; Minami et al., 2010).

Age

WRAP concluded that the main age group of bulk consumers in the US, UK, NZ and Australia were people over 35 years old. In Italy, CRAI found that older customers particularly enjoyed their bulk systems (Minami et al., 2010). In contrast, a study from 1983 found that the population in bulk natural food stores was generally younger than the one in supermarkets (Sommer et al., 1983).

Gender

Johnson (1984) concluded that women were more likely to buy bulk products than men after conducting a study with a sample of 897 shoppers in the US. Women were also more likely to be environmentally concerned, to place more importance in portion control and to appreciate being able to observe the quality of the product before purchase (Johnson, 1984).

Attitudes

According to Italian retailer CRAI, bulk shopping is also appealing to environmentally aware consumers (Minami et al., 2010) and studies claim that there is a niche of customers who place greatest importance in environmental performance (Beitzen-Heineke et al., 2016). These shoppers follow a particular lifestyle where they avoid packaging waste at all costs,

even by delaying shopping if they forget to carry their containers to the store (Rapp et al., 2017). However, clients who place highest importance in sustainability are a minority and most people find package-free sales and reusing containers "annoying, boring and burdensome" (Rapp et al., 2017). Customers in bulk grocery stores also tend to be concerned about health, looking for unprocessed and natural products, containing less chemicals and additives (Rapp et al., 2017).

2.2.4. Implications for Retailers

Reduced Costs

In the food industry, packaging accounts for 8.5% of the food dollar[3] (USDA, 1997) and represents a large proportion of the total cost of production (Minami et al., 2010). In some situations, packaging can even cost more than the product itself, as for instance in glass jars containing spices and herbs (Minami et al., 2010). In a survey conducted by Beitzen-Heineke et al. (2016) to seven package-free stores located across Germany, Austria and Italy, some storeowners mentioned a price reduction of up to 12 euros per kilogram for buying their products in big bags as opposed to pre-packaged. By selling products in bulk, retailers and manufacturers are able to reduce marketing, transportation and production costs, therefore reducing prices (Beitzen-Heineke et al., 2016), and at the same time attracting customers who are interested in cheaper products (Johnson et al., 1985). Moreover, the WRAP report (2007) found that all store managers interviewed across NZ, Australia and the US considered bulk systems to be "highly profitable".

Building a Competitive Advantage

Beitzen-Heineke et al. (2016) also found that storeowners considered bulk products to be more "honest" and to help reduce "food confusion", by removing brands and the false advertising present in some packages. Bulk sections give retailers the chance of creating a new brand identity - even if the products sold are unbranded (WRAP, 2007). Unpackaged goods can become an important part of the stores' brand image, as the pressure for the global FSC to turn greener is rising (Minami et al., 2010) and adopting a more sustainable behaviour can become a competitive advantage (Beitzen-Heineke et al., 2016). Additionally, bulk

[3] According to USDA (United States Department of Agriculture) documentation, a food dollar is "a 1 dollar expenditure on domestically produced food by US consumers" (USDA Economic Research Service).

customers are believed to have an increased store loyalty (Minami et al., 2010; Lofthouse and Bhamra, 2006). Minami et al. (2010) claim that customers in Italy who bought in a supermarket's bulk section showed a higher degree of loyalty to the store, a higher number of weekly visits and a higher average spending amount.

Investment

Inserting a bulk section in already existing supermarkets requires investment in weighing scales, bags, bins (or dispensers) and square meters to place them (Minami et al., 2010). From the producers' standpoint, removing packaging would require distributors to establish new handling and logistics operations (Beitzen-Heineke et al., 2016). In spite of the costs of investment, it is believed that bulk systems offer consistent turnaround and considerable savings in distribution and packaging costs (WRAP, 2007). Moreover, bulk systems are efficient and provide retailers a greater density of product by square meter, as well as easiness of shelf refill, by just filling containers or dispensers through bulk bags (WRAP, 2007).

Spillage and Losses

Some issues bulk retailers may have to deal with come from customers who take part in inappropriate snacking, spillage, contamination and wastage of food (Johnson et al., 1985; WRAP, 2007). Johnson et al. (1985) reported that customers often eat foods directly from bulk bins without paying and regularly use their hands to do so, which may cause contamination. Likewise, food spillage is a regular issue in self-dispensing systems, which in turn causes wastage (WRAP, 2007) and has a negative economic impact for stores (Johnson et al., 1985). Lastly, food contamination by droplets, sneezes, insects and hand manipulation should be reduced by regular monitoring of bulk areas, and could help prevent spoilage and a perception of bad sanitation among consumers (Doser, 1999).

2.3. Environmental Impacts in the Food Supply Chain

The food supply chain is composed by "the agricultural sector, the food processing industry and the distribution sectors (wholesale and retail)" (European Commission, 2009). In 2008, the European Waste Framework Directive 2008/98/EC was introduced to set waste prevention and the reduction of its impacts in the environment (European Union, 2008). Existing

literature presents the adoption of bulk sales by retailers as a way to create a more sustainable supply chain (WRAP, 2007; Beitzen-Heineke et al., 2016; Minami et al., 2010; Rapp et al., 2017).

Packaging Waste

According to Eurostat (2017), 82.5 million tonnes of waste were generated in packaging in 2014 among the 28 countries in the EU (European Union). Packaging waste includes glass bottles, food wrappers, aluminium cans and plastic containers (Eurostat, 2017). It is estimated that a third of packaging worldwide is produced to be used for around one year and then discarded; although it is still unknown exactly how many years the material needs to completely degrade (Koelmans, 2014). According to the Worldwatch Institute, 100 billion plastic bags are thrown out in the US each year (Halweil, 2004).

Although recycling rates have been steadily increasing since 2002 (Eurostat, 2017), many studies describe this practice as inefficient to combat packaging waste as it is costly, time-consuming and only treats the symptoms, rather than the problem (Minami et al., 2010; Beitzen-Heineke, 2016). Eurostat (2017) reports that in 2015, an average of 680 thousand tonnes of plastic was recycled. However, the EU office states that the average cost of sorting and treating plastic was an average of 301€ per tonne in September 2016 (Eurostat, 2017) and literature on the subject defends that "the easiest (and the cheapest) way to handle waste is not to create it" (Barata, 2002). The introduction of bulk sections in supermarkets and the rise of packaging-free practises in retail can help reduce resource waste (Rapp et al., 2017). For instance, after introducing "Eco Point" (a bulk food section), CRAI conducted a study across 25 stores and concluded that in one year they had reduced the number of packages distributed by 700 thousand units (Minami et al., 2010).

Reducing CO_2 Emissions

In 2014, the total CO_2 emissions produced in the European Union were 3 thousand million tonnes (Eurostat, 2016). The increase in energy use and carbon dioxide emissions - as well as increasing concerns towards climate change - have made the reduction of greenhouse gases a priority (Fargione et al., 2008; Weber and Scott Matthews, 2009). Literature indicates the role of package-free purchases as a way to reduce carbon dioxide emissions (Rapp et al., 2017; Beitzen-Heineke et al., 2016). For instance, a zero-packaging store noted that by selling bulk

wine and detergent, 34 tonnes of CO_2 emissions were reduced in the production of packaging (Beitzen-Heineke et al., 2016). Additionally, an initiative to subsidize the sale of unpackaged detergent in Italy was joined by over 40 stores and and found emissions of carbon dioxide were reduced by more than 17 tonnes in a one-year period (Rapp et al., 2017).

Food Waste

Approximately 88 million tonnes of food are wasted in the European Union annually, which represents estimated costs of 143 billion euros (European Commission, n.d.). Moreover, the United Nations' Food and Agriculture Organization estimates that approximately one third of the food produced annually for human consumption is wasted - which represents 1.6 billion tonnes of food (FAO, 2013). Although some studies point to the role of packaging in reducing food waste (Verghese et al., 2015), others conclude that the product not being consumed in time is the main reason for food waste (Quested, Ingle and Parry, 2012), which could be avoided if more customers bought food in bulk, as it reduces the "risk of over purchasing" (Dolci, Nessi, Rigamonti and Grosso, 2015). Beitzen-Heineke et al. (2016) suggest that household food waste could be reduced if more people introduced bulk foods into their shopping routine, as the excessive product that comes in packages would be avoided, causing less spoilage. According to a WRAP report from 2009, 5.3 million tonnes of wasted food out of the yearly total of 8.3 million tonnes could be avoided in the UK (Quested and Johnson, 2009). Moreover, a significant proportion of greenhouse gas emissions in the UK comes from the production of food and drinks that are not consumed, which means that food waste reduction would also help reduce resource waste and environmental impacts of the global food supply chain (Quested et al., 2009).

2.4. The Portuguese Market for Bulk Food Groceries

To identify the existing market for bulk food groceries in Portugal, website *www.agranel.pt* was visited. As stated by Catherine Francisco (creator and launcher), the website identifies existing stores and supermarkets in Portugal selling food groceries in bulk and inserts their location into a digital map, with the goal of making it easier for shoppers to find places to purchase (A Granel, 2017). According to the website, there were 67 bulk stores across Portugal as of October 30th, 2017, 28 of which were located in Lisbon and 27 in Oporto.

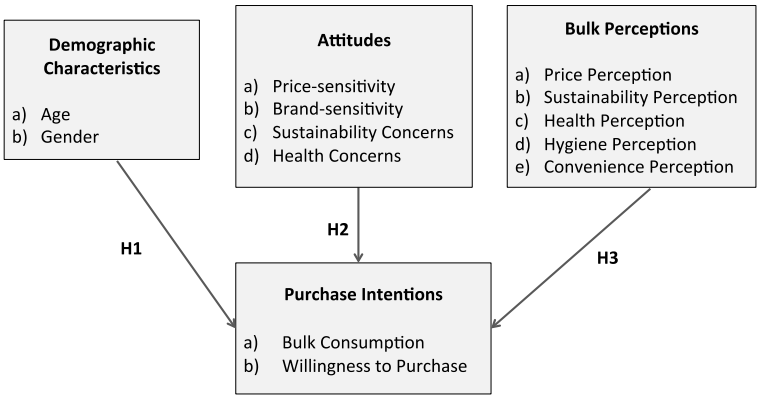
Notwithstanding, the author of this paper identified at least one bulk store in Lisbon that was not included in the database, which insinuates there may be several others missing. Therefore, *agranel.pt* merely served as a tool to estimate the number of players in the market. Moreover, the website does not feature Portuguese large chain supermarkets with bulk food sections.

According to a report by Roland Berger (2009) the two major players in the food retail industry in Portugal were Jerónimo Martins and Sonae. Both these companies started introducing self-dispensing bulk systems in their stores in 2015. According to Sonae's website, the company held 259 *Continente* supermarkets in Portugal in October 2017. Although the total number was not available on the company's online documents, at least two *Continente* stores had already introduced self-dispense areas, which were part of "Hiper do Futuro" conversion, a new store concept inspired by traditional markets (Sonae, 2016). As reported by Jerónimo Martins' *Knowledge Centre*, the company held 404 *Pingo Doce* supermarkets across Portugal and it was possible to find bulk sections in six stores. French retailer Auchan also holds a strong position in the Portuguese market (Roland Berger, 2009) and the company first introduced self-dispense areas in 2012. According to Leonor Castro Caldas - a representative from Grupo Auchan who was interviewed for this study - in October 2017 there were bulk sections in 22 out of the 23 *Jumbo* supermarkets existing in Portugal. Furthermore, the company started introducing a close proximity project called *MyAuchan* in 2017, opening 3 neighbourhood grocery stores with a small area for gravity-fed dispensers until November.

2.5. Conceptual Framework

Although a few studies have investigated what were the main drivers to purchase food in bulk (e.g. Minami et al., 2010; WRAP, 2007) and demographic characteristics of bulk consumers (e.g. Johnson, 1984; Sommer, 1983), there is still a lot to know about the relationship between certain motivational factors and their influence on bulk purchases. Thus, this study aims to test if specific attitudes (price-sensitivity, brand-sensitivity, sustainability concerns and health concerns), demographics (age and gender) and perceptions of bulk (price, sustainability, health, convenience and hygiene perceptions) have an impact on Portuguese consumers'

purchasing behaviour towards bulk food on one side, and on non-consumers' willingness to purchase, on the other.



Hypotheses

Existing literature points towards the influence of certain demographic characteristics on purchasing intentions towards bulk (WRAP 2007; Minami et al., 2010; Johnson, 1984). Therefore, the first hypothesis is suggested:

H1 - Demographic characteristics have an impact on purchase intentions towards bulk food, where:

H1 a) Age has a positive influence on purchase intentions towards bulk;

H1 b) Women have higher purchase intentions towards bulk.

Furthermore, literature identifies attitudinal factors as having an influence on purchase intentions towards bulk food (Minami et al., 2010; Beitzen-Heineke et al., 2017; Rapp et al., 2017); therefore the second hypothesis is suggested:

H2 - Attitudes have an impact on purchase intentions towards bulk, where:

H2 a) Price-sensitivity has a positive relationship with purchase intentions towards bulk;

H2 b) Brand-sensitivity has a negative relationship with purchase intentions towards bulk;

H2 c) Sustainability concerns have a positive relationship with purchase intentions towards bulk;

H2 d) Health concerns have a positive relationship with purchase intentions towards bulk.

Additionally, perceptions of bulk have an impact on consumers' purchase intentions (WRAP, 2007; Beitzen-Heineke et al., 2016; Doser, 1999; Johnson, 1984). Thus, the following hypothesis is presented:

H3 - Bulk perceptions have an influence on purchase intentions towards bulk, where:

H3 a) Price perception has a positive influence on purchase intentions towards bulk;

H3 b) Sustainability perception has a positive influence on purchase intentions towards bulk;

H3 c) Health perception has a positive influence on purchase intentions towards bulk;

H3 d) Convenience perception has a positive influence on purchase intentions towards bulk;

H3 e) Hygiene perception has a positive influence on purchase intentions towards bulk.

Following the interviews carried out during the course of this research (see Chapter 3), additional insights, which were not included in the Conceptual Framework, were found to be relevant for hypotheses testing. These insights were in line with specific findings from previous literature and, therefore, the researcher considered them to be fit for analysis in order to produce added information. Thus, the following hypotheses are suggested:

H4 - Gender has an impact on attitudes (Johnson, 1984; Interview Insights), where: Women have a higher probability of being concerned about sustainability.

Due to the recurrent mention of health as an important factor for bulk food consumers (Rapp et al., 2017; Beitzen-Heineke et al., 2016; Interview Insights) and sustainability concerns being associated with health concerns (Interview Insights), a new hypothesis is suggested, where:

H5 - There is a positive correlation between health concerns and sustainability concerns.

Additionally, Rapp et al. (2017) mentioned there is a niche of customers who place greatest importance in sustainability and these customers are more concerned about reducing packaging waste, which went along with insights from store interviews, therefore:

H6 - Sustainability concerns positively predict container usage.

3. Methodology

3.1. Research Method

The purpose of this study is to examine the main demographic characteristics, attitudes and perceptions of bulk consumers in Portugal. In order to do so, three different methods of data collection were used: observation, qualitative and quantitative research, resulting in a mixed methods approach. Using mixed research means the study is not restrained by a single method, and therefore a wider scope of findings can be generated (Johnson and Onwuegbuzie, 2004). First, price competitiveness of bulk products in Portugal was investigated by undertaking a field study; second, six semi-structured interviews were conducted to identify issues within the Portuguese context; finally an online survey was designed with the purpose of reaching a large number of bulk consumers and non-consumers.

3.2. Data Collection

3.2.1. Price Competitiveness of Bulk

In order to investigate the general belief that bulk products are cheaper than packaged goods (WRAP, 2007; Minami et al., 2010; Johnson et al., 1985), a price comparison between packaged and bulk products was conducted. To do so, four supermarkets were visited during October 2017. The selected stores sold both bulk products and packaged equivalents to the same products, enabling price comparability. Prices were compared using a value per weight unit approach - in this occasion euro per kilogram (€/kg) - in order to simplify observations between pre-packed products - which are sold in different volumes depending on manufacturers - and bulk products, which are sold by weight. In order to guarantee a fair evaluation, prices of bulk products were compared with the cheapest packaged alternative found in the same store[4]. The visited stores were located in Lisbon and were the following: *Continente* (Centro Colombo); *Pingo Doce* (Linda-a-Velha); *Go Natural* (Estoril) and *Jumbo* (Alfragide). A small sample of products was randomly selected inside each store. Overall, a total of 35 products were examined.

[4] This rule was applied in the occasions where the store offered multiple brands of the same packaged product.

Savings When Buying in Bulk

Out of the 35 products investigated, 26 were cheaper in bulk than packaged. Between those 26 products, an average of 35% of savings could be reached when buying a bulk product in comparison to the same amount of its packaged equivalent. The highest observed savings could be found when buying cinnamon at *Jumbo*, where the product was 68% cheaper in bulk than the corresponding packaged version.

Occasions Where Bulk Was More Expensive

There were 9 occasions in which bulk products were more expensive than their packaged alternatives. At *Go Natural*, three out of the eight examined products were more expensive in bulk than packaged. The most expensive bulk product compared to its packaged alternative was organic brown lentils at *Go Natural*, reaching a 77.85% higher price.

General Findings

Continente was the store where the overall savings were higher and *Go Natural* bulk prices had the overall lowest competitiveness (see appendices 1 and 3). Prices were compared by kilogram, thus even when bulk products were more expensive, savings could still be attained for customers who were interested in buying smaller portions of food. Although 9 products were more expensive in bulk than packed, when all 35 products were considered a bulk consumer would still save 22% of money. Notwithstanding, in order to maximize savings, prices per kilogram should always be consulted and compared. Similar to findings in a 1985 study where "large sized packages" were cheaper than bulk (Johnson et al., 1985), there were occurrences where pre-packed products had lower prices per kilogram, so for a higher consumption level, buying packaged groceries sometimes pays off. Appendices 1 through 4 present detailed tables on the price observations.

3.2.2. Store Interviews

With the purpose of exploring insights from Portuguese bulk stores and to look for further findings, six semi-structured interviews were conducted in person to six respondents, each of them owning or working for a different bulk store in the area of Lisbon. The interviews lasted

between 6 and 36 minutes, depending on each respondent's willingness to explore questions in more depth. Although a structured questionnaire was developed prior to store visits, questions were occasionally adapted to grasp unexpected insights or to better fit with each store' characteristics. The six interviews ranged from small groceries where bulk products were the key element (e.g. Maria Granel) to nationwide supermarket chains selling thousands of different packaged products besides bulk (e.g. *Jumbo*).

Main Findings

In order to investigate a general profile of bulk consumers in Portugal, store respondents were asked to describe the main characteristics of their typical customers. Two store respondents mentioned older people as more adherent to the tradition of buying in bulk, similar to findings of Minami et al. (2010). Furthermore, one SR identified women as more prone to look for bulk foods and more concerned about sustainability - as Johnson had claimed in 1984. Leonor Castro Caldas, a representative from Grupo Auchan, added, "the type of person who is concerned about their health is also concerned about the Planet's health", drawing a link between bulk purchases and the common importance placed on the healthiness of food (Beitzen-Heineke et al., 2016). Additionally, four SRs claimed a small portion of customers reused their containers, and SR from Ánanda Bio added, "some customers won't buy packaged products", in line with findings from Rapp et al. (2017). Appendix 5 presents a detailed table on visited stores and appendix 6 shows additional insights from the interviews.

3.2.3. Online Survey

An online survey (see appendix 7) was designed with the purpose of collecting data from a large number of Portuguese grocery shoppers. The survey was developed using Qualtrics research software, a data collection platform that allows users to build a questionnaire to meet specific hypotheses testing needs. Furthermore, the system eases the export of the dataset into IBM SPSS Statistics 24, the statistical software program used in this paper to analyse the collected data.

Using Qualtrics, an anonymous reusable link to the survey was generated, making it possible to share via social media platforms. The survey was mainly shared on Facebook and posted

on the comment sections of various bulk stores' Facebook pages, as well as on a closed Facebook group focusing on waste reduction called "Lixo Zero Portugal", with approximately 2000 members. Additionally, SR from Mercearia da Mila agreed to post the survey on the store's Facebook page. The aforementioned pages were targeted so that a significant sample of bulk consumers could be contacted. Prior to being launched, the survey was pre-tested on a group of 9 people, in order to identify possible inaccuracies and correct them in time.

The survey was composed of 24 questions and divided into 2 sections: one for bulk consumers and another for non-consumers. This way, not only bulk consumption could be investigated, but main barriers for bulk purchases could also be identified. After answering the first question "Do you buy food groceries for your household?" (where answering "No" automatically ended the questionnaire), respondents were presented with the question "Do you have the custom of buying food groceries in bulk?" in order to discriminate between frequent buyers and non-buyers, after which respondents were redirected to their designated section. This item also presented a description of food groceries as "including: legumes, grains, dried nuts, breakfast cereal, spices, dehydrated fruit, pasta, seeds, dried berries and tealeaves" and "excluding fresh produce", which was added to the description after a pre-test showed one of the respondents thought fresh fruit and vegetables were also included.

The bulk consumer section was organized as follows: 8 questions were asked regarding shopping behaviour (e.g. how many purchases were made in bulk), main advantages of bulk (based on the main advantages of bulk found in literature), number of bulk stores visited, motivations behind store choice, barriers to making more purchases and container usage. The bulk non-consumer section asked questions regarding shopping behaviour, main barriers to bulk purchases (based on findings from literature regarding disadvantages of bulk) and a scale to test willingness to purchase bulk food, using a five-point scale where 1 - Definitely would not buy and 5 - Definitely would buy.

Afterwards, all respondents were directed to a section where 4 scales were used to measure specific attitudinal behaviours (*price-sensitivity*, *brand-sensitivity*, *health concerns* and *sustainability concerns*) and perception of bulk products (*hygiene perception*, *health perception*, *price perception*, *convenience perception* and *sustainability perception*). These scales were formulated taking into account the main demographic and attitudinal

characteristics of bulk consumers found in literature. The five-point scales asked respondents to rate their level of agreement with 23 statements, where 1 - Not at all and 5 - Completely.

Finally, respondents were asked 5 questions regarding demographic characteristics (age, gender, academic qualification, household dimension and professional occupation). Respondents were also presented with the opportunity to take part in a give-away, where a voucher of 25€ was drawn to be used at an organic store selling bulk products located in Lisbon.

Survey Scales

Price-sensitivity and brand-sensitivity (Q15)

In order to measure the level of *price-sensitivity* of respondents, a two-item scale was generated, based on the one developed by Lichtenstein, Netemeyer and Burton (1990). The purpose was to evaluate the overall price-sensitivity of shoppers using a five-point scale where respondents were asked to rate their level of agreement to each item, where: 1 - Not at all and 5 - Completely. Additionally, with the purpose of testing *brand-sensitivity*, a two-item scale was adapted from Kapferer and Laurent (1992), where shoppers were given the same five-point scale.

Sustainability and health concerns (Q16)

In the interest of evaluating respondents' *sustainability concerns*, a two-item scale was based on the one established by IISD (International Institute for Sustainable Development, 2009) measuring knowledge, attitudes and behaviours towards sustainable behaviour. Additionally, in order to measure respondents' food-related *health concerns*, a scale was adapted from Michaelidou and Hassan's (2008) measures of attitudes towards organic food, food safety concerns and health consciousness. Here, the same five-point scale asked respondents to determine their level of concordance to each statement.

Bulk Perceptions (Q16 and Q17)

With the purpose of measuring Portuguese shoppers' perceptions of bulk products, multi-items scales were developed. Both in Q16 and Q17, a five-point scale was used to evaluate the level of agreement with 14 statements regarding convenience perception, price perception, hygiene perception, health perception and sustainability perception. In order to measure *convenience perception* and *perceived price*, items were adapted from Byoungho and Kim

(2003) into the context of bulk shopping. To evaluate *sustainability* and *health perceptions* of bulk foods, items were adapted from Roitner-Schobesberger, Darnhofer, Somsook and Vogl (2007) scientific study on the perception of organic food, where the word "organic" was replaced by "bulk". To evaluate the *hygiene perceptions* of bulk food, two items were adapted from Fatimah, Boo, Sambasivan and Salleh (2011) study on consumer perceptions of foodservice hygiene.

Reliability of Scales

Cronbach's Alpha and Spearman-Brown tests were computed using SPSS, in order to examine if the scales adapted from previous studies still held reliability. The *health concerns* scale showed an alpha above 0.7, indicating high reliability. *Convenience perception* presented an alpha between 0.5 and 0.7, suggesting moderate reliability, which was improved after the item "I enjoy being able to customize the amount of product purchased" was eliminated from the scale.

Scale	Initial Number of Items	Cronbach's Alpha	Cronbach's Alpha if Item Deleted	Item Deleted	Final Number of Items
Health Concerns	3	0,756	-	-	3
Convenience Perception	4	0,567	0,637	1	3

Table 1 - Cronbach's Alpha output for health concerns and convenience perception scales.

Spearman-Brown tests were used to evaluate the remaining scales (**Table 2**), as this is considered the most reliable coefficient to measure two-item scales (Eisinga, Grotenhuis and Pelzer, 2013). Excluding *hygiene perception* - which showed a moderate reliability between 0.5 and 0.7 - all scales presented coefficients above 0.7, indicating high reliability.

Scale	Number of Items	Spearman-Brown Coefficient
Price-sensitivity	2	0,745
Brand-sensitivity	2	0,791
Sustainability Concerns	2	0,783
Price Perception	2	0,740
Sustainability Perception	2	0,830
Health Perception	2	0,828
Hygiene Perception	2	0,689

Table 2 - Spearman-Brown output coefficients for price-sensitivity, brand-sensitivity, sustainability concerns, price perception, sustainability perception, health perception and hygiene perception scales.

Survey Sample

The survey was active between November 27th and the December 4th, 2017. During that period of time, a total of 359 answers were collected. Out of those answers, 47 were from respondents who started the questionnaire but did not finish it and another 3 were removed for belonging to people who did not make grocery purchases. Therefore, 309 respondents composed the total sample considered for data analysis. The sample was characterized by 227 respondents (73%) who were bulk consumers and 82 non-consumers (27%).

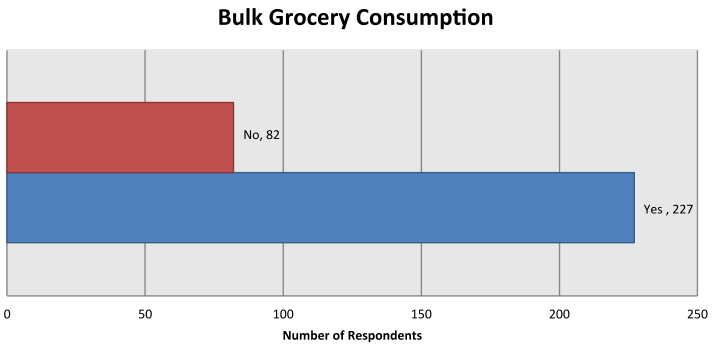


Image 1 - Data collected from the question "Do you have the custom of buying food groceries in bulk?"

Regarding gender, 265 respondents were female, which represents 86.3% of the total sample and only 12.4% of respondents were male. Concerning age, 36.2% of the sample was aged between 26 and 35, 22.2% were between 36 and 45 years old and 21.8% of respondents were between 18 and 25.

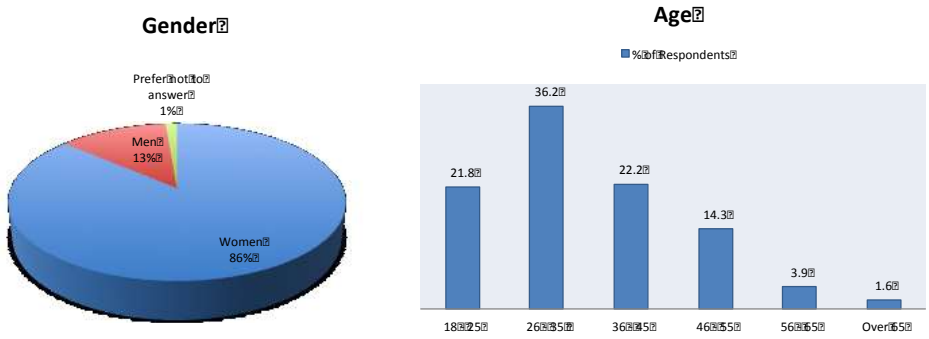


Image 2 - Gender distribution and age distribution of the survey sample

The majority of respondents - or 80.8% - had completed a Bachelor's degree or higher, 17.6% of respondents had graduated High School and 1.9% had finished 9th or 4th grade. In terms of professional occupation, 56.5% of the sample was employed, 20.4% was composed by either students or student-workers and 10.4% worked from home.

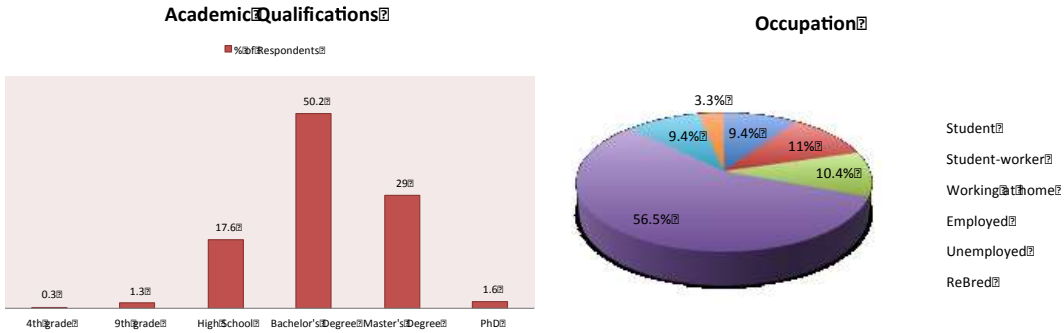


Image 3 - Academic qualifications and professional occupations of the survey sample

Finally, in regards to household dimension, 34.1% of respondents lived in a home composed by two elements, 22.1% lived in a household of three elements, 20.4% with four elements, 17.9% lived alone and 5.5% lived in households of five or more people.

4. Results and Analysis

4.1. Descriptive Statistics

4.1.1. Bulk Consumers

The following results were collected from the survey section dedicated to bulk consumers whom, as mentioned above, represented 73% of the total sample.
When asked how many of their grocery purchases were made in bulk, 24.7% of respondents declared "more than half" or "all". Still, the majority (51.4%) of bulk respondents answered either "less than half" or "almost none".

	Frequency	Percent	Cumulative Percent
All	8	3.5	3.5
More than half	48	21.2	24.7
Half	54	23.8	48.5
Less than half	91	40.1	88.6
Almost none	26	11.4	100
TOTAL	227		

Table 3 - Frequency table for question "How many of your grocery purchases are made in bulk?"

A conditional question for the last two items revealed "It doesn't exist in certain stores" and "There is less variety of products" were the main reasons for not making more bulk purchases, followed by "Certain products are more expensive in bulk". Additionally, out of the 16 respondents who picked the option "Other", 12 mentioned store location as a barrier.

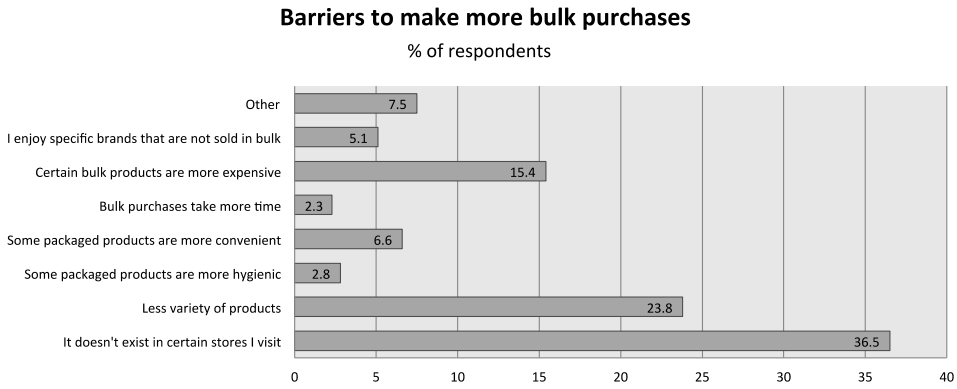


Image 4 - Bar chart presenting main barriers to make more bulk purchases for bulk consumers who selected items "less than half" or "almost none"

Regarding choice of bulk store, a large portion of respondents claimed they either visited "Always the same store" (42.7%) or "One or two different stores" (40.9%). When asked to score from 1 to 6 (where 1 - Most important and 6 - Least important) the most important motives for store choice, "price" was mentioned by 24.2% of the sample. Following "price", "location" (23.1%), "availability of organic products" (22.5%) and "quality" (20.8%) were the highest rated motives. On the other hand, "service" was the item most frequently (36.7%) mentioned as least important.

When asked about the main advantage of purchasing in bulk, "Reducing packaging waste" was the most mentioned reason (30.6%), followed by "Choosing the amount of product" and "Avoiding food waste". Surprisingly, "Saving money" was only mentioned by 8.3% of the sample.

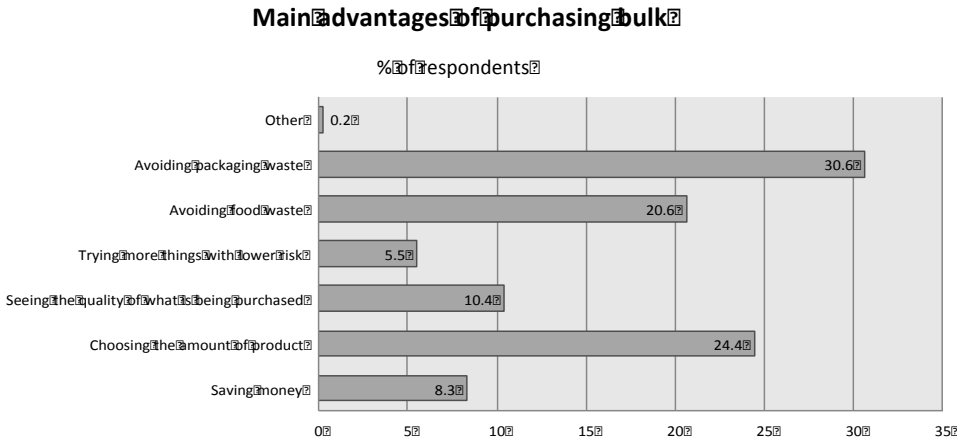


Image 5 - Bar chart presenting distribution of main advantages of purchasing bulk, according to bulk consumers

Lastly, when respondents were asked if they carried their own containers to bulk stores, 31.4% answered "always", a much higher percentage than expected. Additionally, 27.9% answered "sometimes", 13.3% responded "rarely" and 27.4% claimed they "never" carried their own containers.

4.1.2. Non-Consumers of Bulk

Non-consumers of bulk represented 27% of the total survey sample. According to data collected, the main reason for not making bulk purchases was "It isn't available at the store I go to" (44.3%), followed by "Less variety of products" (18%) and "It is burdensome" (8.2%).

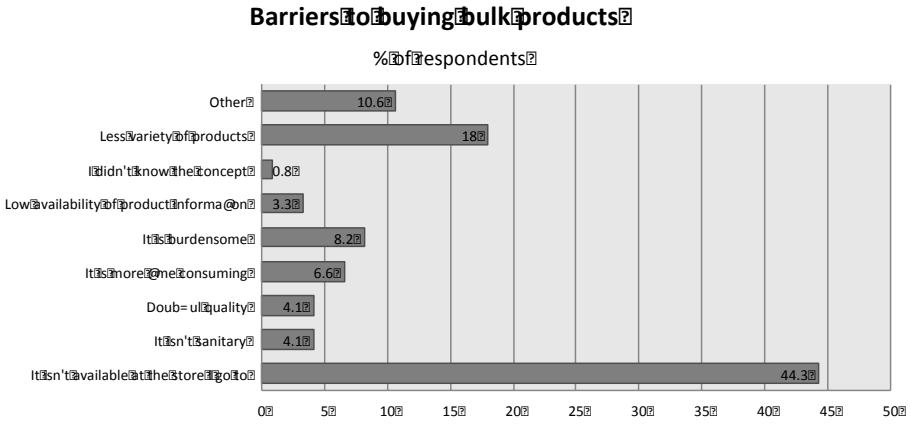


Image 6 - Bar chart of main barriers to purchase bulk, according to non-consumers

Non-consumers were also invited to comment on their willingness to purchase bulk food. The majority of respondents answered either "definitively would buy" (36.6%) or "probably would buy" (30.4%), showing favourable purchasing intentions towards bulk. "Could buy" was selected by 28.1%, and "probably would not buy" and "definitively would not buy" were only marked by 4.9% of the sample.

4.2. Inferential Statistics

The hypotheses suggested in Chapter 2 aimed at testing if demographic characteristics, attitudes and perceptions of bulk had an impact not only on the consumption of grocery food in bulk, but also on non-consumers' willingness to purchase bulk. Therefore, all hypotheses were tested first using *bulk consumption*[5] as the dependent variable and second, using non-consumers'[6] *willingness to purchase* bulk as the dependent variable. *Willingness to purchase* was measured using data collected from the question "Please, rate your willingness to purchase bulk food" using a five-point scale where 1 - Definitely would not buy and 5 - Definitely would buy.

4.2.1. The Impact of Demographics on Purchase Intentions

In order to test hypothesis **1**, "Demographic characteristics have an impact on purchase intentions towards bulk", several statistics tests were undertaken using SPSS.

Bulk Consumption and Demographics

Point-biserial correlations between *bulk consumption* (where 0 = No and 1 = Yes) and demographic characteristics (*age* and *gender*) of respondents were tested. Neither of the variables presented a statistically significant relationship with the consumption of food in bulk ($p > .05$) and, therefore, there is no correlation between *bulk consumption* and respondents' *gender* or *age*. Hypotheses **1 a)** and **1 b)** are both rejected for this variable.

Willingness to Purchase and Demographics

Correlations between non-consumers' (N = 82) willingness to purchase (*WTP*) bulk and demographic characteristics were tested (**Table 4**) using one-tailed, point-biserial correlation coefficients. It was hypothesized that *age* had a positive impact on purchase intentions towards bulk. The correlation between *age* of respondents and *WTP* is negative and statistically significant ($r = -.34$, $p < .01$), although the strength of the relationship is low. Therefore, we can conclude that *age* has a negative impact on *WTP*, rather than positive: the

[5] Here, "bulk consumption" refers to grouping the sample in two, between respondents who answered "No" and respondents who answered "Yes" to the question "Do you have the custom of purchasing grocery food in bulk?".
[6] Non-consumers were considered all who answered "No" to the question "Do you have the custom of purchasing grocery food in bulk?".

younger the consumer, the higher the purchase intentions. On the other hand, *gender* did not present a significant correlation with *WTP*.

	Age	Gender
Willingness to Purchase	-.34**	-.08

Table 4 - Correlation coefficients between non-consumers' WTP and demographics, $^{**}p < .01$

A simple regression analysis was performed in order to predict non-consumers' *WTP* bulk from *age* (**Table 5**). The results show *age* influences the variation in *WTP* by 10% (*Adjusted* R^2 = .10) and the correlation is low (R = .34). Furthermore, the effect of *age* on non-consumers' *WTP* bulk is negative and significant ($F_{(1,81)}$ = 10.22, B = -.23, t = -3.2, $p < .01$), thus the hypothesis **1 a)**, "Age has a positive influence on purchase intentions" is rejected for *WTP*, because the results show *age* impacts *WTP* in the opposite direction.

	Willingness to Purchase		
	B	*F*	*Adjusted* R^2
Model		10.22**	.10
Age	-.23**		

Table 5 - Simple regression between non-consumers' WTP bulk (dependent variable) and age of respondents (independent variable), $^{**}p < .01$

4.2.2. The Impact of Attitudes on Purchase Intentions

Next, statistics tests were computed in order to test hypothesis **2**, "Attitudes have an impact on purchase intentions towards bulk".

Bulk Consumption and Attitudes

Correlations between *bulk consumption* and attitudes were calculated using one-tailed point-biserial correlations (**Table 6**). *Price-sensitivity* was expected to have a positive relationship with *bulk consumption*. The point-biserial Pearson correlation does not support this hypothesis (r = .08, $p > .05$). On the other hand, food-related *health concerns* (r = .23, $p <$

.01) and *sustainability concerns* (r = .23, p < .01) both show significant positive correlations with *bulk consumption*, although the strength of the relationships was weak. Additionally, *brand-sensitivity* presented a low negative correlation with *bulk consumption* (r = -.16, p = < .01), as had been hypothesized. Hypothesis **2 a)** "Price-sensitivity has a positive relationship with purchase intentions", is rejected for *bulk consumption*.

	Price-sensitivity	Brand-sensitivity	Health Concerns	Sustainability Concerns
Bulk Consumption	.08	-.16**	.23**	.23**

Table 6 - Point-biserial correlation coefficients between attitudes and bulk consumption (where 0 = No and 1 = Yes), **p < .01

Independent t-tests were generated in order to compare mean scores of attitudinal characteristics between consumers and non-consumers of bulk groceries. B*ulk consumption* was used as the grouping variable to test differences in attitudes between the two groups. On average, *price-sensitivity* is higher on bulk buyers (M = 3.61, SE = .063) than non-buyers (M = 3.43, SE = .121) but this difference is not statistically significant (p > .05). As predicted, *brand-sensitivity* is lower on bulk consumers (M = 2.45, SE = .061) and higher on non-consumers (M = 2.78, SE = .098) and this difference is statistically significant (p < .01). In regards to *sustainability concerns*, bulk consumers have higher scores (M = 4.11, SE = .053) than non-consumers (M = 3.66, SE = .101) and the results are significant (p < .001). Finally, *health concerns*' mean scores also agreed with the prediction. Bulk consumers have higher mean scores in *health concerns* (M = 4,12, SE = .049) than non-consumers (M = 3.74, SE = .075) and the results are statistically significant (p < .001).

	MEAN Yes	**SD** Yes	**MEAN** No	**SD** No	**MEAN** Yes – **MEAN** No
Price-sensitivity	3.61	0.95	3.43	1.09	0.18
Brand-sensitivity	2.45	0.92	2.78	0.88	-0.33**
Sustainability Concerns	4.11	0.78	3.66	0.88	0.45***
Health Concerns	4.12	0.72	3.74	0.66	0.38***

Table 8 - Independent t-test for differences between consumers (yes) and non-consumers (no) of bulk, **p < .01, ***p < .001

Willingness to Purchase and Attitudes

Furthermore, correlations between non-consumers' *WTP* and attitudes were tested using one-tailed Pearson correlations (**Table 7**). *Price-sensitivity* shows a positive, significant correlation with *WTP* ($r = .23$, $p < .05$) and *brand-sensitivity* presented a negative relationship with *willingness to purchase*, as predicted by the hypothesis ($r = -.24$, $p < .05$). Both *health concerns* ($r = .36$, $p < .01$) and *sustainability concerns* ($r = .50$, $p < .01$) presented positive, moderate, correlations with *willingness to purchase* bulk food. In this situation, we can say that all attitudes had a positive impact towards *WTP*, apart from *brand-sensitivity*, which impacts *WTP* negatively. Therefore, the hypotheses were all supported.

	Price-sensitivity	Brand-sensitivity	Health Concerns	Sustainability Concerns
Willingness to Purchase	.23*	-.24*	.36**	.50**

Table 7 - Correlation coefficients between attitudes and willingness to purchase of non-consumers, *$p < .05$, **$p < .01$

A multiple regression was performed (**Table 9**), in order to predict non-consumers' *willingness to purchase* bulk from the four predictor attitudes. The model presents a moderate correlation between *WTP* and the predictor variables ($R = .51$) and can account for 21.8% of the variability in WTP (*Adjusted* $R^2 = .22$). Notwithstanding, out of the four variables, only *sustainability concerns* presents a significant positive effect on *WTP*. Therefore, hypothesis **2 a)**, **2 b)**, and **2 d)** are rejected and hypothesis **2 c)** is accepted.

	Willingness to Purchase		
	B	*F*	*Adjusted* R^2
Model		6.29***	.22
Price-sensitivity	.07		
Brand-sensitivity	-.13		
Health Concerns	.13		
Sustainability Concerns	.43**		

Table 9 - Multiple regression between WTP of non-consumers (dependent variable) and attitudes (independent variables), **$p < .01$, ***$p < .001$

4.2.3. The Impact of Perceptions on Purchase Intentions

In order to test hypothesis **3**, "bulk perceptions have an impact on the purchasing intention towards bulk", the following tests were computed using SPSS.

Bulk Consumption and Perceptions

Point-biserial correlations were generated in order to test the relationship between bulk perceptions and *bulk consumption* (Table 10). *Sustainability perception* (r = .19, p < .01), *hygiene perception* (r = .15, p < .01) and *convenience perception* (r = .28, p < .01) have positive, significant correlations with *bulk consumption*, although the strength of the relationships is weak. *Health perceptions*, on the other hand, have no correlation with *bulk consumption* and the hypothesis is rejected.

	Price Perception	Sustainability Perception	Hygiene Perception	Health Perception	Convenience Perception
Bulk Consumption	.04	.19**	.15**	.07	.28**

Table 10 - Point-biserial correlations between perceptions and bulk consumption (No = 0, Yes = 1), **p < .01

In order to test differences in bulk perceptions between buyers and non-buyers of bulk, independent t-tests were computed (**Table 12**). *Sustainability perception* was predicted to have a positive relationship with purchasing behaviours. On average, bulk consumers present higher scores in this variable (M = 4.45, SE = .046) than non-consumers (M = 4.12, SE = .106) and the test shows this difference is significant (p < .01). *Hygiene perception* was expected to have a positive relationship with purchasing intentions towards bulk. Bulk consumers have higher average mean scores (M = 3.75, SE = .050) than non-consumers (M = 3.48, SE = .092) and the results are statistically significant (p < .01). *Convenience perception* was expected to present a positive relationship with purchasing behaviour. The average mean scores are in fact higher for bulk consumers (M = 3.37, SE = .053) than non-consumers (M = 2.85, SE = .089) and the results are statistically significant (p < .001). Both *price* and *health perceptions* show results that are not statistically significant (p > .05) and therefore, we cannot reject the null hypotheses for the two items.

	MEAN Yes	**SD** Yes	**MEAN** No	**SD** No	**MEAN** Yes – **MEAN** No
Price Perception	3.23	0.82	3.15	0.84	0.08
Sustainability Perception	4.45	0.68	4.12	0.96	0.33**
Hygiene Perception	3.75	0.75	3.48	0.82	0.27**
Health Perception	3.50	0.82	3.37	0.96	0.13
Convenience Perception	3.37	0.79	2.85	0.80	0.52***

Table 11 - Independent samples t-test for perceptions of bulk consumers ("yes") and non-consumers ("no"), $^{**}p < .01$, $^{***}p < .001$

Willingness to Purchase and Perceptions

Moreover, Pearson correlations were used to test the relationship between non-consumers' *WTP* bulk and bulk perceptions (**Table 11**). Once again, *price perception* does not present a statistically significant correlation. *Sustainability* ($r = .55$, $p < .01$), *hygiene* ($r = .58$, $p < .01$) and *health perceptions* ($r = .40$, $p < .01$) present moderate, positive and significant correlations with *WTP*. *Convenience perception* ($r = .31$, $p < .01$) shows a weak, positive and significant correlation. Thus, *price-sensitivity* is rejected.

	Price Perception	**Sustainability Perception**	**Hygiene Perception**	**Health Perception**	**Convenience Perception**
Willingness to Purchase	.17	.55**	.58**	.40**	.31**

Table 12 - Correlation coefficients between non-consumers' WTP and bulk perceptions, $^{**}p < .01$

A multiple regression was conducted to predict non-consumers' *WTP* bulk from four predictor perceptions. The model indicates a strong correlation between the outcome variable and the independent variables ($R = .71$) and explaines 48% of the variability in *WTP* bulk (*Adjusted* $R^2 = .48$). As presented in **Table 13**, *sustainability perceptions* and *hygiene perceptions* have positive and significant relationships with *WTP*, whereas the three other predictors have non-significant effects. For that reason, hypotheses **3 b**), "Sustainability perception has a positive influence on purchase intentions towards bulk" and **3 e),** "Hygiene perception has a positive influence on purchase intentions towards bulk", are supported for *WTP* and hypotheses **3 a)**, **3 c)** and **3 d)** are rejected.

	Willingness to Purchase		
	B	*F*	*Adjusted R^2*
Model		19.04***	.48
Sustainability Perception	.38***		
Hygiene Perception	.52***		
Health Perception	.09		
Convenience Perception	.08		

Table 13 - Multiple regression between non-consumers' WTP (outcome variable) and bulk perceptions (predictor variables), ***$p < .001$

4.2.3. Additional Insights

Gender's Impact on Sustainability Concerns

Following hypothesis **4** "Women have a higher probability of being concerned about sustainability", point-biserial correlations were computed. The test showed there is a negative correlation between *gender* and *sustainability concerns*, and the relationship is statistically significant ($p < .01$). Because values are coded so that 0 = Women and 1 = Men, we can conclude that a negative correlation between *gender* and *sustainability concerns* means that there is a positive correlation between women and *sustainability concerns*.

	Gender
Sustainability Concerns	-.17**

Table 14 - Correlation coefficients between gender (where 0 = Women and 1 = Men) and sustainability concerns, **$p < .01$

The next step was computing a simple regression to predict *sustainability concerns* from *gender* (**Table 15**). The quality of the model is low, given that the correlation is weak (R = .17) and *gender* can only account for 2% of the variability in *sustainability concerns* (*Adjusted* R^2 = .02). The test shows that the effect of *gender* on *sustainability concerns* is negative and significant. Therefore, hypothesis **4** is accepted.

	Sustainability Concerns		
	B	*F*	*Adjusted* R^2
Model		8.30**	.02
Gender	-.35**		

Table 15 - Linear regression between gender (where 0 = Women and 1 = Men) and sustainability concerns (dependent variable), ** $p < .01$

Correlation Between Health Concerns and Sustainability Concerns

Pearson correlation (**Table 16**) showed there is a strong, positive relationship between food-related *health concerns* and *sustainability concerns* ($r = .67$, $p < .01$) and the results are statistically significant. Therefore, hypothesis **5** "There is a positive correlation between *health concerns* and *sustainability concerns*" is accepted.

	Health Concerns
Sustainability Concerns	.67**

Table 16 - Pearson correlation between health concerns and sustainability concerns, ** $p < .01$

Sustainability Concerns Positively Predict Container Usage

In order to test hypothesis **6**, we started by computing a one-tailed Pearson correlation between *sustainability concerns* and *container usage* (**Table 17**). Here, *container usage* refers to the question "Do you carry your own containers when purchasing bulk products?", for which possible answers were "always", "often", "sometimes" or "never". Pearson correlation shows there is a significant and positive correlation between *sustainability concerns* and *container usage*.

	Sustainability Concerns
Container Usage	.50**

Table 17 - Pearson correlation between sustainability concerns and container usage, ** $p < .01$

Finally, a linear regression between *sustainability concerns* (predictor variable) and *container usage* (outcome variable) was computed. The model has a moderate quality ($R = .5$) and

sustainability concerns explains 25% of the variability in *container usage* (*Adjusted* R^2 = .25). This model is appropriate to predict *container usage* (F (1, 222) = 73.85, p < .001) and there is a significant effect. Thus, hypothesis **6** is accepted.

	Container Usage		
	B	*F*	*Adjusted* R^2
Model		73.85***	.25
Sustainability Concerns	-.76***		

Table 18 - Linear regression between sustainability concerns (predictor) and container usage, ***p < .001

5. Conclusions, Future Research and Limitations

5.1. Conclusions

This paper had the objective of studying consumer attitudes, characteristics and perceptions of bulk foods in Portugal. Using secondary data collected from previous studies as a framework, a research methodology was developed in order to collect primary data. The first step was to analyse the market for bulk food groceries in Portugal and investigate the competitiveness of price. The research showed prices of bulk products in Portuguese supermarket chains are not necessarily always cheaper than their packaged alternatives. This be explained by the competitiveness of price attained by manufacturers of highly industrialized packaged products. Plus, retailers are required to charge higher margins in unpackaged foods than in pre-packed products, to make up for the additional handling and possible losses that come from selling in bulk. In the four investigated stores, overall average prices were lower in bulk than in the packaged alternatives, similar to discoveries from Johnson et al. (1985). However, while some stores offered substantial average savings in bulk, in others this value was not as significant and a few products were even considerably more expensive.

Six interviews were conducted to storeowners and to a bulk representative from Grupo Auchan, in order to gather information from people who had experienced first hand the Portuguese bulk groceries market. Self-dispensing systems' sanitation is a common challenge that requires stricter control and regulations from bulk stores. Grupo Auchan, being a large retailer with low supervision in dispensing areas, deals with a high rate of theft, spillage and inappropriate behaviours (such as customers snacking on food), an issue that seems to be suppressed in smaller stores with higher supervision from the clerk. These concerns were identical to the ones expressed in a previous study conducted by Doser (1999). Although cheaper prices are considered a central benefit of bulk, interviewees expressed the need to charge higher margins when compared to packaged products, as a way to offset the high rate of losses. Environmental benefits are also a central theme for storeowners and, in general, customers are incentivized to reuse containers, although most still utilize the bags provided by the store to pack their groceries.

Finally, results from an online survey were interpreted and statistically analysed in order to produce findings. Portuguese food-grocery shoppers presented favourable purchase intentions towards bulk. Furthermore, a large proportion of bulk non-consumers consider store location and the lack of availability of bulk as the main barriers to purchase, hinting that higher availability would attract more buyers. In the same line, the majority of bulk consumers consider the non-availability of bulk in certain stores and the lower variety of bulk products to be the main impediments to making more purchases. These findings could point towards a market opportunity for businesses that are interested in joining the "package-free" movement.
Bulk consumers also showed a high level of store loyalty, and the large majority visits only one or two stores. Even though price is the most important factor for store choice, Portuguese consumers seem to place the highest importance in sustainability when buying in bulk. Packaging waste reduction is considered the main advantage of bulk purchases and a great deal of the sample already reuses containers when shopping. Furthermore, being able to customize the right amount of product and reducing food waste were high rated motivations for respondents.

In terms of demographic characteristics, no relationship was found between women and purchase intentions towards bulk, as Johnson (1984) had established. Furthermore, contrary to previous findings (Minami et al., 2010), this research found younger shoppers to have a higher willingness to purchase bulk, rather than older shoppers. However, women are in fact more concerned about sustainability than men, as declared by Johnson (1984) and gathered from an interviewed storeowner.
The results on this paper show that bulk buyers are less sensitive to name brand, more concerned about making sustainable choices when shopping and place greater importance in food-related health than non-buyers. Plus, grocery-shoppers who don't buy bulk products but have higher concerns for sustainability are more willing to purchase unpackaged foods.
Bulk consumers also tend to perceive bulk as more sustainable, more hygienic and more convenient than non-consumers. The results show that the purchase intentions of non-buyers are also influenced by how sustainable and how hygienic they perceive bulk to be. Although price was mentioned in prior literature as a central benefit of purchasing food in bulk (Minami et al., 2010), neither the respondents' sensitivity to price nor their perceptions of bulk being cheaper resulted in higher purchase intentions.
Further tests to the dataset showed there is a positive relationship between respondents' sustainability concerns when shopping for groceries and their food-related health concerns.

Additionally, as defended by findings of Rapp et al. (2017), shoppers who place highest importance in sustainability also have a higher probability of reusing containers when purchasing bulk goods.

5.2. Limitations and Future Research

It is important to acknowledge that the findings gathered during the course of this study were susceptible to a number of limitations. First, the four stores selected for price investigation belong to supermarket chains, constraining the observations from reaching a wider scope of the Portuguese bulk market, which is composed by businesses of diversified sizes and nature. Future researchers are advised to undergo a more heterogeneous observation to better understand price competitiveness in the overall market. Plus, the dataset collected from the online survey was composed by 309 valid answers, but only 82 came from non-buyers of bulk, which is a smaller number than desired considering that many statistic tests were undertaken using only this part of the sample as a dependent variable. On the other hand, the survey was posted on a Facebook group dedicated to practises on waste reduction, which means that a portion of "bulk consumer" responses could have come from a sample biased towards sustainable concerns and behaviours. Furthermore, the large majority of responses came from women. With a sample composed by only 13% male respondents, a gender bias limited hypotheses testing that relied on this demographic variable. It is also relevant to note that 94.5% of the sample was aged between 18 and 55, missing out on an older segment that is believed to be the most inclined to purchase bulk (Minami et al., 2010). Future research should focus on using face-to-face questionnaires as a research tool, in order to capture a higher sample of customers between 55-74, considering that this segment has the lowest rate of Internet adhesion in the European Union (Eurostat, 2012). Finally, seven of the survey scales used to test various consumer attitudes and perceptions had only two items. According to Eisinga et al. (2013), two-item scales translate into less reliable measures and the more items a scale has, the better the construct's representation.

Appendices

Appendix 1 - Price per kilogram comparison between bulk and packaged food in *Continente* (Centro Colombo) visited on October 17th, 2017.

Product Type	€/kg Bulk	€/kg Package	Savings in Bulk
Brazil Nuts (organic)	23.99	34.90	31.26%
Almonds (organic)	24.49	39.90	38.62%
Walnuts (organic)	24.49	33.20	26.23%
Cashews (organic)	22.49	34.95	35.65%
Pumpkin Seeds (organic)	8.99	18.00	50.05%
Red Lentils (organic)	3.49	5.78	39.62%
Cuscus (organic)	2.49	3.90	36.15%
Bulgur (organic)	2.49	3.60	30.83%
Chickpeas (organic)	4.99	4.97	- 0.40%
Average Savings in Bulk			**32%**

Appendix 2 - Price per kilogram comparison between bulk and packaged food in a *Jumbo* store (Alfragide) visited on October 17th, 2017.

Product Type	€/kg Bulk	€/kg Package	Savings in Bulk
Coconut Shavings	10.40	17.90	41.90%
Red Lentils	2.20	4.98	55.82%
Black Eyed Peas	1.70	1.80	5.56%
Saffron	11.90	11.80	- 0.84%
Oats	2.50	3.60	30.56%
Cornflakes	2.90	5.57	47.94%
Raisins	7.90	5.96	- 32.55%
Cinnamon	8.90	27.78	67.96%
Mashed Potato Powder	2.60	2.85	8.77%
Oregano	20.90	36.25	42.34%
Curry Powder	13.90	13.11	- 6.03%
Cayenne Pepper	16.90	23.00	26.52%
Average Savings in Bulk			**24%**

Appendix 3 - Price per kilogram comparison between bulk and packaged food in a *Go Natural* store (Estoril) visited on October 17th, 2017.

Product Type	€/kg Bulk	€/kg Package	Savings in Bulk
Walnuts (organic)	26.99	33.20	18.70%
Red Lentils (organic)	6.99	5.38	- 29.93%
Raisins (organic)	6.99	9.95	29.75%
Brown Lentils (organic)	7.79	4.38	- 77.85%
Quinoa (organic)	5.29	9.98	46.99%
Oats (organic)	1.99	2.98	33.22%
Chickpeas (organic)	4.99	3.78	- 32.01%
Cuscus (organic)	3.69	5.98	38.29%
Average Savings in Bulk			**3.40%**

Appendix 4 - Price per kilogram comparison between bulk and packaged food in a *Pingo Doce* store (Linda-a-Velha) October 18th, 2017.

Product Type	€/kg Bulk	€/kg Package	Savings in Bulk
Raisins	5,49	7,95	30.94%
Pealed Almonds	15,95	22,00	27.5%
Cashews – Fried and Salted	16,99	15,27	- 11.26%
Peanuts – Honey and Salt	7,99	18,43	56.64%
Walnuts	21,25	19,95	- 6.52%
Trail Mix	12,99	14,95	13.11%
Average Savings in Bulk			**18.40%**

Appendix 5 - Store interviews: Name, location, time of visit, type of store, number of bulk products sold, type of system, and size of each store.

Store Name	Time of interview	Type of store/ Positioning	Type of Dispensing System	Number of Bulk Products	Size
Ánanda Bio	October 19th, 2017	100% organic "Modern bulk"	Self-service; Bulk bins	16	Grocery store
Maria Granel	October 20th, 2017	100% organic "Modern Bulk"	Self-service, Gravity-fed dispensers	< 500	Grocery store
Bagas e Sementes	October 20th, 2017	"Traditional bulk"	Staff-served; Bulk bins	86	Grocery store
Casa a Granel	October 20th, 2017	"Traditional bulk"	Self-service; Gravity-fed dispensers	< 400	Grocery store
Mercearia da Mila	October 23rd, 2017	"Modern bulk"	Staff-served; Bulk bins	25	Grocery store
Jumbo	October 25th, 2017	"Traditional bulk"	Self-service; Bulk bins + gravity-fed dispensers	> 700	Supermarket

Appendix 6 - Interview questions and main insights:

"How long has the store been open?"

The most recent store had opened 5 months prior to the interview and the oldest one had been open for 2 years. Grupo Auchan, in contrast, had starting introducing bulk sections in their Portuguese stores in 2012, and they were present in 22 out of their 23 Jumbo stores at the time of the interview.

"Which bulk product is the bestseller?"

In general, nuts and dried fruit were the declared bestsellers.

"Does the store offer packaged alternatives to the bulk products?"

At Jumbo stores, nearly all of the 700 products offered in bulk had packaged alternatives. Maria Granel, Casa a Granel and Bagas e Sementes were bulk stores in nature, so very few products were sold in packages as, for instance, honey, which is a challenging product to sell in bulk. Mercearia da Mila and Ánanda Bio were grocery stores that sold mainly packaged

products and only a few bulk products. At Mercearia da Mila, some bulk products were sometimes pre-packaged by store clerks for "people who want to grab them on the go".

"Do customers bring their own containers to the store?"

At the five interviewed groceries, it was possible for customers to carry containers to the store and its tare would be removed from the final price. Four SRs mentioned some of their customers had the habit of using their own containers, and SR from Ánanda Bio even added, "some customers won't buy packaged products". SR from Maria Granel believed the number of people who reused containers was "growing every day". However, they all seemed to agree that only a small portion of customers followed this practice. Five SRs also claimed that their stores had a policy of incentivizing customers to adopt reusable containers. At Jumbo stores, however, customers were not allowed to use their own containers.

Hygiene/sanitation considerations:

SR from Mercearia da Mila argued hygiene was "probably the main downsize for customers". Ánanda Bio respondent recalled one time their bulk rice got weevil for being stored in a bin as opposed to a package. SRs from Maria Granel and Casa a Granel declared sanitation in bulk stores had much stricter regulation than in regular groceries. Bagas e Sementes SR explained that bulk products were all served by the store clerk, which made sanitation much easier to manage. At Jumbo, all bulk bins were being replaced for gravity-fed dispensers in order to improve sanitation control. The bulk representative from Grupo Auchan claimed people often snacked on products or took them without paying. In order to prevent customers from bearing unsanitary behaviours, Jumbo bulk sections had signs instructing people to wear plastic gloves and use serving spoons.

"What do you consider the main advantages of buying in bulk?"

Five out of six interviewees mentioned price as the main advantage of buying in bulk. Maria Granel SR also claimed bulk was an opportunity for customers to try out new products at a "lower risk". The representative from Grupo Auchan also mentioned reduced food waste as a main advantage. In contrast, Mercearia da Mila SR suggested the environmental benefits should be the main advantage for customers, although he wasn't sure.

"What are the main characteristics of your typical bulk customer?"

In the three bulk-exclusive stores interviewed, SRs declared "people of all ages" were customers and both Maria Granel and Bagas e Sementes SRs also noted that older people liked the traditional element of bulk. On the other hand, the Grupo Auchan representative and Mercearia da Mila SR made a distinction between different age groups' motivations to buy bulk, where older people liked to choose how much of a product they bought and people between 18 and 40 were "concerned about sustainability and health". Mercearia da Mila SR also mentioned women as more concerned about sustainability, as Johnson had claimed in 1984. The Grupo Auchan representative also believed that people who bought at organic stores were less price-sensitive and tended to be more environmentally concerned, whereas people who bought at traditional bulk stores were more price-sensitive. Leonor Castro Caldas added, "the type of person who is concerned about their health is also concerned about the planet's health".

Price considerations

All interviewees acknowledged they were able to sell bulk at lower prices than packaged products because bulk products also came at a cheaper price for retailers. SR from Bagas e Sementes - a traditional bulk store - especially focused on this subject. The Grupo Auchan representative explained that highly industrialized products "such as cornflakes" could be more difficult for retailers to sell in bulk at lower prices. When asked about the reason why some products were more expensive in bulk than packaged at the researcher's time of visit to Jumbo stores, she added that bulk sections and packaged products worked as two separate units inside the company, so although when a bulk product is introduced it is cheaper than existing packaged alternatives, as time goes by and certain supplier relationships change, it becomes harder to control.

Retailer considerations

Two SRs declared the choice to sell bulk was due to sustainability concerns, "it was not a financial decision" as SR from Ánanda Bio stressed. Mercearia da Mila SR declared it would be "much easier" for him to only sell packaged goods, because bulk was risky, caused food waste (e.g. some products had shorter shelf lives for not being packaged) and service would be less time consuming (given that staff had to store products back to their bags) on a daily basis. Two SRs also noted that margins had to be higher in bulk products, to make up for spillage, theft and spoilage. The Grupo Auchan representative added that the company dealt

with "a high rate of unidentified losses", higher than the ones in fresh produce. However, she believed that the cash flow was "very positive" in Jumbo bulk sections.

Appendix 7 - Online Survey

1. Introduction to the survey

Cara(o) participante,
Sou aluna da Católica Lisbon - School of Business and Economics e estou a recolher respostas no âmbito da minha tese de mestrado sobre a venda de produtos de mercearia a granel (ou avulso). O granel caracteriza-se pela venda de produtos sem embalagem, que podem ser comprados por unidade ou a peso.
Depois de recolher respostas, um voucher de compras no valor de 25€ será sorteado entre os participantes. Para participar no sorteio, basta colocar o seu endereço de e-mail no fim do questionário (o e-mail não será divulgado ou usado para qualquer tipo de correspondência à parte da participação no sorteio).
O questionário demora cerca de 5 minutos a preencher e todas as participações serão anónimas. Caso surja alguma dúvida por favor contacte-me através do e-mail msalgueirocosta@gmail.com.
Obrigada por participar!
Maria Salgueiro Costa

2. Costuma comprar produtos alimentares para sua casa?

- Sim
- Não

- Condition: answering "No" would end the questionnaire.

3. Costuma comprar artigos de mercearia a granel?
(Artigos de mercearia incluem: leguminosas, grãos, frutos secos, cereais de pequeno almoço, especiarias, fruta desidratada, arroz, massa, sementes, bagas e infusões; excluindo fruta e verduras)

- Sim
- Não

Display This Question:
If Costuma comprar artigos de mercearia a granel?(Artigos de mercearia incluem: leguminosas, grãos,... = Sim
4. Quantas vezes por mês faz compras alimentares?

- Uma ou duas
- Duas ou três
- Três ou quatro
- Mais de quatro

Display This Question:

If Costuma comprar artigos de mercearia a granel?(Artigos de mercearia incluem: leguminosas, grãos,... = Sim

5. Dessas compras, quantas diria que são feitas a granel?

- Todas
- Mais de metade
- Cerca de metade Menos de metade
- Quase nenhumas

Display This Question:

If Costuma comprar artigos de mercearia a granel?(Artigos de mercearia incluem: leguminosas, grãos,... = Sim

6. Se respondeu "menos de metade" ou "quase nenhumas" na pergunta anterior, por favor indique por que razão não compra mais artigos a granel.
(Pode escolher até três opções)

- Não existe em certas lojas onde vou
- Não existe tanta variedade de produtos a granel
- Prefiro comprar certos artigos embalados por ser mais higiénico
- Prefiro comprar certos artigos embalados por ser mais prático
- Demora mais tempo
- Há artigos que são mais caros a granel
- Há marcas de que gosto e que não existem a granel
- Outra. Qual?

Display This Question:

If Costuma comprar artigos de mercearia a granel?(Artigos de mercearia incluem: leguminosas, grãos,... = Sim

7. Por que motivo gosta de comprar produtos a granel?
(Pode escolher até três opções)

- É mais barato
- Posso escolher a quantidade
- Posso ver a qualidade do que estou a comprar
- Posso experimentar mais coisas com menos risco
- Para evitar desperdício alimentar
- Para evitar desperdício de embalagens
- Outro. Qual?

Display This Question:

If Costuma comprar artigos de mercearia a granel?(Artigos de mercearia incluem: leguminosas, grãos,... = Sim

8. Qual dos seguintes se aproxima melhor do tipo de loja onde costuma fazer compras a granel?
(Pode escolher uma ou duas opções)

- o Hipermercado ou supermercado
- o Supermercado (ou loja) de produtos biológicos
- o Loja de produtos a granel
- o Loja de produtos biológicos a granel
- o Mercearia de bairro

Display This Question:

If Costuma comprar artigos de mercearia a granel?(Artigos de mercearia incluem: leguminosas, grãos,... = Sim

9. Quando faz compras a granel...

- o Vai sempre (ou quase sempre) à mesma loja
- o Vai a uma ou duas lojas diferentes
- o Vai a duas ou três lojas diferentes
- o Vai a mais de três lojas

Display This Question:

If Costuma comprar artigos de mercearia a granel?(Artigos de mercearia incluem: leguminosas, grãos,... = Sim

10. Quais são as principais motivações quando escolhe a loja onde compra a granel?
(Por favor pontue por ordem de importância em que: 1 - mais importante; 6 - menos importante)

_____ Preço

_____ Qualidade

_____ Diversidade de produtos

_____ Disponibilidade de produtos biológicos

_____ Serviço

_____ Localização

Display This Question:

If Costuma comprar artigos de mercearia a granel?(Artigos de mercearia incluem: leguminosas, grãos,... = Sim

11. Quando faz compras a granel costuma levar os seus próprios frascos?

- Sempre
- Às vezes
- Raramente
- Nunca

Display This Question:

If Costuma comprar artigos de mercearia a granel?(Artigos de mercearia incluem: leguminosas, grãos,... = Não

12. Quantas vezes por mês faz compras alimentares?

- Uma ou duas
- Duas ou três
- Três ou quatro
- Mais de quatro

Display This Question:

If Costuma comprar artigos de mercearia a granel?(Artigos de mercearia incluem: leguminosas, grãos,... = Não

13. Por que motivo não faz compras a granel?
(Pode escolher até três opções)

- Não existe na loja onde vou
- É pouco higiénico
- A qualidade dos produtos é duvidosa
- Demora mais tempo
- Dá mais trabalho
- Os produtos não têm informação nutricional/receitas
- Não conheço o conceito
- Não há tanta variedade de produtos a granel
- Outro. Qual?

Display This Question:

If Costuma comprar artigos de mercearia a granel?(Artigos de mercearia incluem: leguminosas, grãos,... = Não

14. Por favor, indique qual destas frases se aproxima mais da sua opinião: "A minha disposição para comprar produtos a granel é..."

- Definitivamente não compraria
- Provavelmente não compraria
- Poderia comprar
- Provavelmente compraria
- Definitivamente compraria

15. Imagine que está a comprar mercearias na loja onde vai habitualmente. Até que ponto se identifica com as seguintes afirmações?

	Nada	Pouco	Mais ou menos	Bastante	Totalmente
Comparo várias marcas para ter a certeza que compro o produto mais barato.	○	○	○	○	○
Prefiro comprar produtos de marcas conhecidas.	○	○	○	○	○
Comparo o preço por quilo de cada produto para saber que estou a escolher o mais barato.	○	○	○	○	○
Se a loja onde vou não oferece a marca que quero comprar, prefiro esperar.	○	○	○	○	○

16. Continue a imaginar o cenário anterior. Até que ponto concorda com as seguintes afirmações?

	Nada	Pouco	Mais ou menos	Bastante	Totalmente
Escolho alimentos a pensar nos benefícios que vão trazer à minha saúde.	○	○	○	○	○
Preocupo-me com as consequências que os meus hábitos de compra possam ter no bem estar ambiental.	○	○	○	○	○
Preocupo-me com comprar alimentos mais naturais e menos processados.	○	○	○	○	○
Procuro comprar produtos que venham em embalagens recicláveis ou possíveis de reutilizar.	○	○	○	○	○
Procuro comprar produtos de origem biológica.	○	○	○	○	○

17. Agora, imagine que está a comprar produtos de mercearia a granel. Até que ponto concorda com as seguintes afirmações?

	Nada	Pouco	Mais ou menos	Bastante	Totalmente
Os produtos a granel são mais baratos.	○	○	○	○	○
Comprar a granel é mais sustentável.	○	○	○	○	○
Geralmente, os produtos a granel são mais saudáveis.	○	○	○	○	○
Gosto de poder regular a quantidade que compro de cada produto.	○	○	○	○	○
Os produtos a granel têm menos aditivos.	○	○	○	○	○
Gostava que houvesse mais informação disponível nas etiquetas dos produtos.	○	○	○	○	○
Comprar a granel é melhor para o ambiente.	○	○	○	○	○

18. Continue a imaginar o cenário anterior. Até que ponto concorda com as seguintes afirmações?

	Nada	Pouco	Mais ou menos	Bastante	Totalmente
Comprar a granel demora mais tempo.	○	○	○	○	○
Os produtos a granel têm todas as condições de higiene.	○	○	○	○	○
Comprar a granel dá mais trabalho.	○	○	○	○	○
Há menos variedade de produtos a granel.	○	○	○	○	○
Gostava que os produtos mostrassem informação nutricional.	○	○	○	○	○
Os produtos a granel não são higiénicos.	○	○	○	○	○
É mais caro comprar a granel.	○	○	○	○	○

19. Por favor, indique a sua idade

Menos de 18
- 18 - 25
- 26 - 35
- 36 - 45
- 46 - 55
- 56 - 65
- Mais de 65

20. Por favor, indique o seu género
- Feminino
- Masculino
- Prefiro não responder

21. Por favor, indique as suas habilitações literárias
- Doutoramento
- Mestrado
- Licenciatura
- 12º ano
- 9º ano
- 4º ano

22. Por favor, indique o número de pessoas do seu agregado familiar

- Vive sozinha(o)
- Duas pessoas
- Três pessoas
- Quatro pessoas
- Cinco pessoas
- Mais de cinco

23. Por favor, indique a sua ocupação actual

Estudante
Trabalhador-estudante
Trabalha em casa
Empregado
Desempregado
Reformado

24. Survey conclusion

Obrigada por chegar até aqui!
Para participar no sorteio de um voucher no valor de 25€, por favor insira o seu e-mail na caixa de texto abaixo e carregue de seguida na seta em baixo para finalizar o questionário.
O voucher poderá ser usado na Miosotis, um espaço em Lisboa com produtos 100% biológicos e uma secção de venda a granel.
(O seu e-mail não será divulgado ou usado para qualquer tipo de correspondência à parte da participação no sorteio. O vencedor do sorteio será contactado através de uma mensagem de correio electrónico.)

NOTA - Se não desejar participar, por favor carregue na seta em baixo de modo a que as suas respostas não sejam perdidas.

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